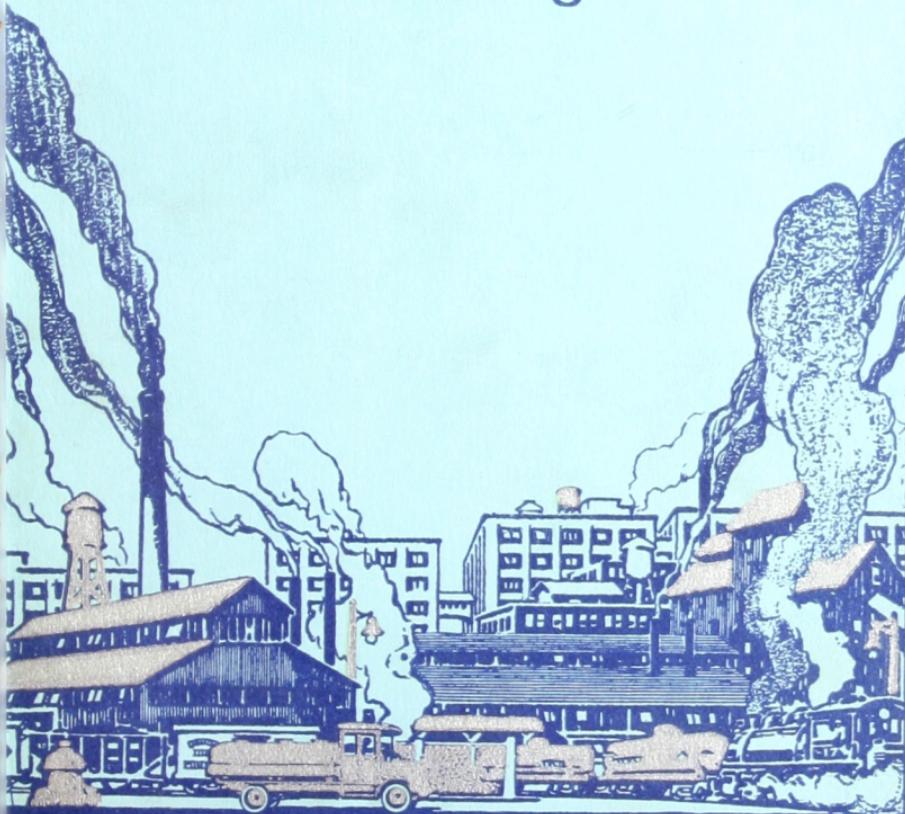


142-14.

ALUMINUM PAINT

A Step Ahead in
Industrial
Painting





JAN 26 1928

ALUMINUM PAINT

A TREATISE ON THE
PHYSICAL PROPERTIES OF ALUMINUM PAINT
AND ITS USES
IN MODERN INDUSTRY

by

JUNIUS D. EDWARDS
ASSISTANT DIRECTOR OF RESEARCH



ALUMINUM COMPANY
OF AMERICA
PITTSBURGH · PENNSYLVANIA

Aluminum Paint—a new kind of paint that has many and varied applications

ALUMINUM PAINT

ALUMINUM Paint is fundamentally different from other paints. The metallic aluminum flakes called aluminum bronze powder, which are its pigment portion, have many unique and useful properties which no other paint pigment has. The simple mixing of this aluminum bronze powder with a suitable oil or varnish vehicle at once provides an aluminum paint which renders unusually satisfactory service in many and varied applications. Its preparation, properties and uses will be discussed in the following pages.

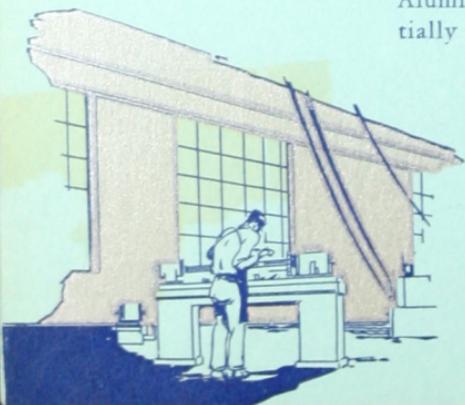
I. "The Coat of Mail"

Aluminum bronze powder for paint is made by stamping aluminum into very small and thin flakes. These are carefully sized by a series of sieves to give a uniform product.

The powder is then finished by a special polishing process which gives it a lustrous and brilliant surface.

The shape of the particles of aluminum bronze powder is of particular interest. The ordinary pigment materials like zinc oxide, red lead, white lead, etc., are composed of particles distinctly granular in form even though they be exceedingly small. Aluminum bronze powder is, however, essentially flake-like in character because of the

stamping process used in its manufacture. When polished powder is suspended in a vehicle like varnish, a curious phenomenon can be observed. The little particles of aluminum swirl about in the liquid and many of them come to the surface of the liquid and remain there. Very



*Greater surface-protection, durability and better appearance
achieved through a unique principle—"leafing"*

quickly an almost continuous film of metallic aluminum is formed at the surface of the varnish by the little flakes of aluminum which arrange themselves, in layer upon layer, much like fish scales. The aluminum particles appear to float upon the liquid, but it is really a surface tension effect which holds them there; the phenomenon is descriptively called "leafing." This unusual distribution of the pigment in the vehicle confers unusual properties upon the paint. From the standpoint of appearance, the metallic film, almost as highly reflecting as a sheet of polished aluminum, is very attractive. It is also very useful.

It is opaque to light and hence the vehicle underneath is protected from the deteriorating action of sunlight. Sunlight, and particularly the ultra-violet part of the spectrum, is one of the major causes of deterioration of paint vehicles. It is due in no

small part, we believe, to the complete opacity of aluminum bronze powder that aluminum paints show such remarkable

life and protective power. It is only by the extremely slow weathering away of the upper layers of aluminum and vehicle that the successive lower layers are exposed. In protecting the paint vehicle from deterioration, the surface underneath the paint is likewise protected. Aluminum paint has proven itself in actual service as a superior paint for protecting structural steel, wood and all outdoor structures.

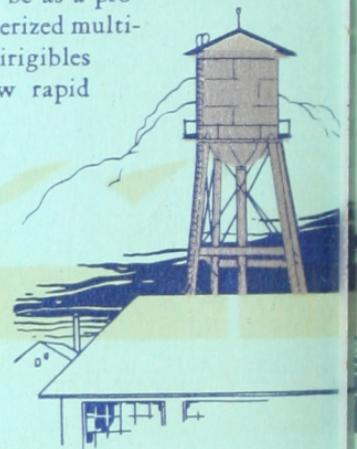
This protective action of aluminum bronze powder is due not only to its opacity to light, but also to its high reflectivity for light. Because it reflects so much and absorbs so little of the radiant energy which may fall on it, the temperature of



Keeps the sun's heat out—Its unique value for painting oil tanks, tank-cars and refrigerator cars

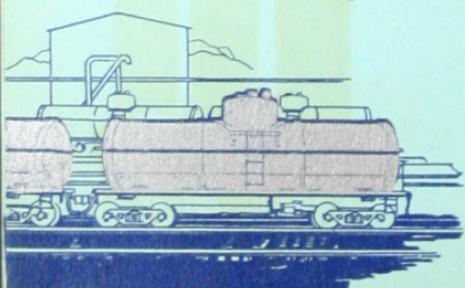
the paint and the material underneath remains substantially lower than would be the case with the many paints of lower reflectivity.

The Bureau of Standards has shown, in a somewhat different field, how effective aluminum bronze powder can be as a protective medium on balloon fabrics. The rubberized multiply fabrics used for the gas containers of dirigibles and other lighter-than-air craft may show rapid deterioration in service largely because of the action of sunlight upon the rubber and textile composing the fabric. The period of service can be greatly extended, however, by using aluminum bronze powder in the outside coating of rubber. The aluminized fabrics remain very much cooler when in the sunlight. Large airships like the Los Angeles are given an outer coating of aluminum paint both for protecting the fabric and for purposes of temperature control.



In one test an aluminum coated fabric reached a temperature of 117 degrees Fahrenheit when in sunlight, while another fabric not so coated, but green in color, reached a temperature of 147 degrees Fahrenheit. It is not surprising, with this difference in temperature, and the known opacity to light, that the aluminum-protected fabric should remain serviceable for a much greater period than the other fabric. Rubber is in some respects quite different from linseed oil or varnish, but it is similar to them in suffering deterioration from light and oxidation. In order to make balloon fabrics relatively impermeable to gas, oils such as tung oil have been occasionally resorted to as a coating medium. However, in order to protect the oil it has been found necessary in this case also to incorporate aluminum bronze powder with it.

The beneficial property of aluminum coatings in minimizing the heating effect of sunlight has already been referred to in the case of balloon fabrics. Aluminum paint may be employed for a



*Unprejudiced exposure tests show unusual durability
of Aluminum Paint as protective for outdoor surfaces*

similar purpose in many fields much nearer home than aviation.

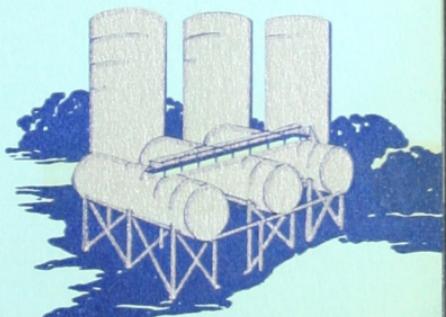
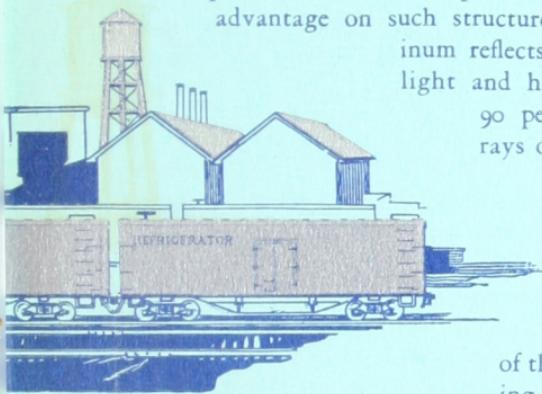
There are many structures such as oil storage tanks, gas holders, refrigerator cars, tank cars, buildings of various sorts, etc., which are exposed to sunlight and which it is desirable to keep as cool as possible. Aluminum paint may be employed to great advantage on such structures. Bright metallic aluminum reflects some 70 per cent of the light and has a reflectivity of about 90 per cent for so-called heat rays or infra-red light. A well-

made aluminum paint will reflect 60 to 70 per cent of the light and probably therefore, a corresponding-ly higher percentage of the infra-red heat waves falling on it. A practical utilization of the high reflectivity of

aluminum is illustrated on a succeeding page where tests by the Bureau of Mines on a group of 55,000 barrel oil storage tanks are described.

Mr. Henry A. Gardner has recently reported on a series of test panels made with aluminum paint (see Circular No. 231, Paint and Varnish Manufacturers' Association of the U. S.). Three different vehicles were used in these tests and after about four and a half years' exposure, panels covered with two coats of aluminum paint are reported to be in excellent condition, and a further extended period of useful service is certain to be obtained.

P. H. Walker and E. F. Hickson of the United States Bureau of Standards have also had aluminum paint under test for more than four years and their description of their tests in Chemical and Metallurgical Engineering (Vol. 31, page 693, 1924) is further evidence of its great durability.



Only pure Aluminum Bronze Powder gives lasting protection — Some vehicles recommended

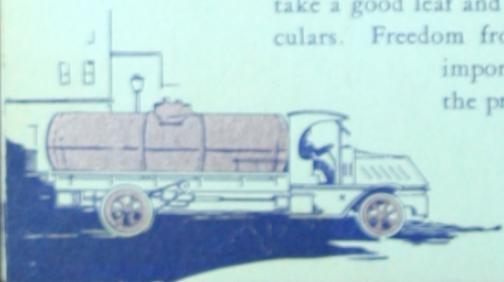
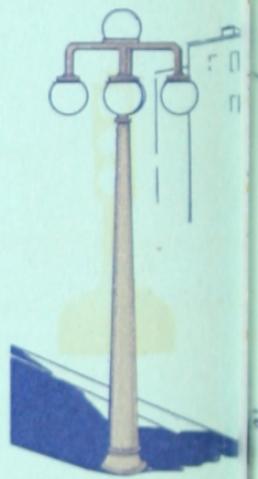
II. Composition and Characteristics

Before discussing further the properties and uses of aluminum paint, some attention should be paid to its composition.

Aluminum bronze powder is generally graded according to mesh size. Standard Varnish powder has been sifted through a standard 140-mesh screen. A somewhat coarser grade is known as Extra Brilliant powder, and has been passed through a 120-mesh screen. A finer grade is the Extra Fine powder, which has been passed through a 160-mesh screen. Finer grades than this are made, but their use is generally confined to lithographing and special uses other than paints. The statement that Standard Varnish powder has been passed through a 140-mesh screen does not mean that the particles are all of uniform size corresponding to the opening in a standard sieve having 140-meshes to the inch. It simply means that this is about the maximum size; the greater part of the material is of very much finer size (through 200-mesh screen), and the distribution of particles of all sizes is such as to give a pigment having minimum voids, which is, of course, desired in any paint. Standard Varnish powder is the grade most generally used for paints.

The production of an aluminum bronze powder of high quality has been the result of extensive research and the development of novel manufacturing processes. Rigid supervision and inspection are essential in maintaining uniformity and high quality.

Inferior powders will be lacking in luster, color, ability to take a good leaf and hold it, as well as in other particulars. Freedom from adulterants such as mica is important, since tests have shown that the protective properties and durability of the paint are seriously affected by such conditions.



Aluminum Paint gives unusual coverage—500 to 700 square feet per gallon

Aluminum bronze powder is used with a wide variety of vehicles, but obviously for any particular application some will be more suitable than others. One of the most widely used vehicles for paints is linseed oil. Raw linseed oil alone is generally unsatisfactory for use with aluminum powder because the mixture is too thin in consistency and the paint film runs and streaks. Its drying time is also much too slow for most purposes. Boiled linseed oil is likewise too thin in consistency to give good results.

However, linseed oil which has been thickened or "bodied" by heating, commonly known as kettle bodied linseed oil can be very successfully used since the heat treatment process gives the oil the consistency of a varnish. For aluminum paint a kettle bodied linseed oil should be of such consistency that a mixture of about 60 parts oil with 40 parts of mineral spirits or turpentine will make a satisfactory vehicle for aluminum powder.

A suitable drier should also be incorporated in the oil during processing. Tests indicate that linseed oil bodied by "blowing" with air will not prove as durable as that bodied by heat alone.

Two pounds of powder are required for one gallon of vehicle. Such a paint proves very satisfactory as an exterior protective coating. Its covering power is excellent—one gallon ordinarily covers 500 to 700 square feet of smooth surface. Its durability is also excellent under average atmospheric conditions. It is rather slow drying, however, and will usually require 10 to 12 hours to set to touch and 30 to 40 hours to dry. This would be disadvantageous in smoky or dusty locations where the paint would accumulate a coat of dirt before drying.



Varnish vehicles specially recommended for use in Aluminum Paint

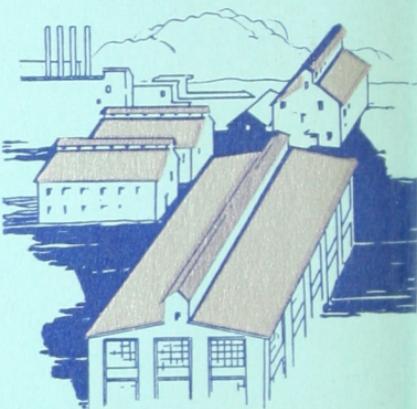
The action of the aluminum powder in forming a continuous leafed surface tends to retard drying of the oil and for this reason it sometimes may be found desirable to add a little additional liquid drier, such as "Japan Drier." In very cold weather, also, the drying will probably be much slower and it is under these conditions we advise the addition of more drier.

Standard Specification No. 16 of the Federal Specifications Board (Bureau of Standards' Circular No. 98) covers a suitable grade of thinner.

Varnish vehicles are particularly well adapted for making aluminum paint because of their excellent spreading and covering characteristics. Varnishes also dry to a hard film more rapidly than linseed oil paints, and this is much to be desired for many purposes. Spar varnish, in particular, forms with aluminum powder, a hard, durable paint film which is almost impermeable to moisture and quite resistant under severe atmospheric conditions.

Spar varnishes are ordinarily made for use without added pigment and may be too thick unless more thinner is added. Thinning the varnish may, however, impair the quality of the aluminum paint to be made from it. A large number of varnish vehicles have been especially developed for use in making aluminum paint and it is recommended that such vehicles be employed since they are of the correct consistency and composition for use without further additions.

For exterior use a so-called "long oil" spar varnish is to be preferred and should contain about 50 per cent or more of non-volatile oils and gums. It should dry before 24 hours



*Aluminum Paint mixes very easily—It may be sprayed
or brushed on as desired*

to a tough, elastic and durable film. Chinawood oil is an essential ingredient in many of these varnishes and is very valuable in increasing their resistance to permeation by moisture. Many of these specially prepared varnish vehicles are being used with aluminum powder with great satisfaction and their use will be greatly extended when their particular virtues are more widely known.

Where a particularly hard and durable coating is desired, especially on small objects, a baking lacquer can be used very effectively. Some of these lacquers which have been used very successfully are in the nature of a spar varnish.

There are many quick drying lacquers, and paints made with a cellulose nitrate or acetate base. These work well with aluminum bronze powder, but will, in general, prove most serviceable only indoors or where protected from the weather. Their durability outdoors is low compared with many other vehicles, but for some special purposes where the life of the paint is not important they will find some use.

The ease with which aluminum bronze powder can be stirred up to a uniform mixture with oil stands out in contrast with the difficulty of dispersing most pigments in oil. It is therefore unnecessary and undesirable to grind aluminum bronze powder in oil or to make a paste of it before thinning the paint to the proper consistency. It is only necessary to pour the proper amount of vehicle over the powder and stir with a paddle until uniform; it is then ready for use.

Polished aluminum bronze powder gradually loses its power of rapid leafing when it stands in the vehicle. A vehicle may be developed which will overcome this difficulty, but for the present it is recommended that only enough paint for one day's use be mixed at one time.



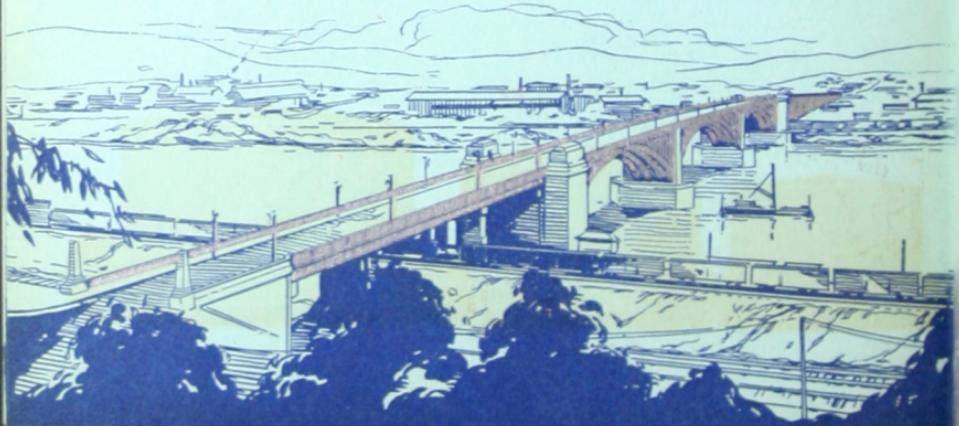
There are on the market at the present time a few ready-mixed paints which will prove satisfactory for many purposes. In general, these should be used with reasonable promptness after manufacture.

Aluminum Paint film is opaque—hence its exceptional power of "one-coat hiding"

A properly mixed aluminum paint spreads and works well under the brush, and may be brushed out into a thin coat. Aluminum paint should be brushed out much as other paints are, and to secure a uniform appearance, the finishing strokes should all be in the same direction. If diluted somewhat with an additional amount of mineral spirits, it may be easily applied with a spray gun, and this is perhaps the best method for use on rough surfaces, such as brick and concrete block walls.

III. Special Properties of Aluminum Paint

Among the many unique properties of aluminum paint, attention should be called to its exceptional hiding power. The hiding power of a paint is its ability to obscure. In repainting a sign board, for example, it would be first necessary to obliterate the old design. Aluminum paint made with polished powder accomplishes in one coat the same degree of hiding that would require several coats of white lead paint. The superior hiding power of aluminum paint can be demonstrated by painting it on a sheet of glass and holding it against an electric light. One uniform coat will hide the lamp filament completely, while a number of coats of most other paints will be required to accomplish the same degree of hiding. Since the aluminum bronze powder is opaque to light, it is obvious why one uniform coat is all that is required for interior painting. However, for exterior work on unpainted steel or wood, two coats will give much better protection than one, and the use of at least two coats is always to be recommended in such cases. In many instances in



One coat sufficient for interior painting—two or three coats for outdoor surface-protection

repainting structures where the undercoats are in satisfactory condition one coat of aluminum paint is sufficient and other coats can be applied in succeeding years, thus increasing the protection rendered by the paint and decreasing the cost per year, while improving the average appearance.

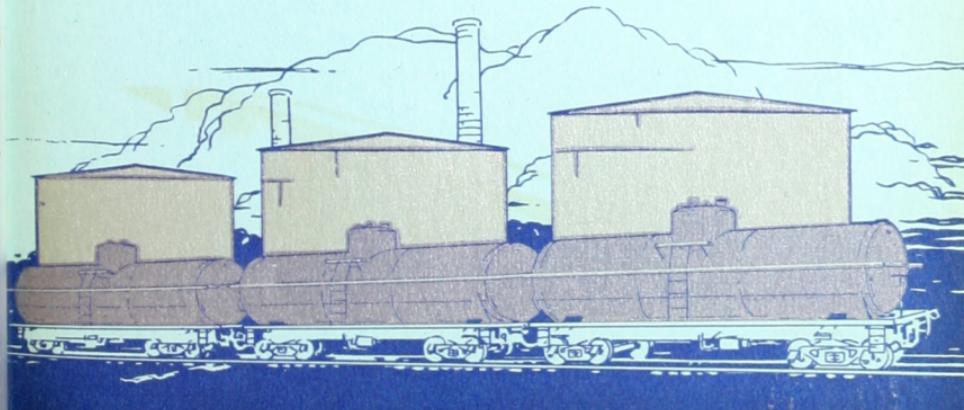
In addition to its exceptional hiding properties, aluminum paint has long been used to prevent "bleeding through" of stains and colors in under coats. It is thus frequently employed in stenciling numbers over black paint, or as a foundation coat in repainting stained wood preparatory to applying a finish coat of white enamel.

Aluminum bronze powder is, of course, non-poisonous; it is made of the same metal from which cooking utensils are made. The elimination of the danger of lead poisoning will be appreciated by every painter.

Structural Paint

Many power companies are finding aluminum paint more satisfactory than galvanizing for protecting the steel towers used in supporting power lines. One advantage they find is that any defective spot in the painting is rendered visible by the streak of brown rust which will eventually form, and which appears plainly visible against the bright aluminum paint, so that it can be detected and remedied.

In painting towers, bridges, and structures in general, the painter appreciates the difference in weight between a pail of aluminum paint and a pail of red lead paint, for example. Two quarts of



Aluminum Paint durably protects towers, bridges, structural work—Indoors, it increases lighting efficiency

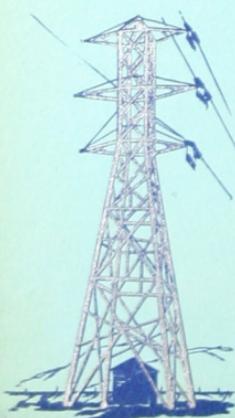
aluminum paint (2 pounds aluminum powder per gallon) will weigh about $4\frac{1}{4}$ pounds. The same amount of red lead paint (standard formula: 25 pounds red lead per gallon of oil) will weigh about 13 pounds. A painter can consequently carry a larger volume of aluminum paint at one time and that with less effort than with the lead oxide paints.

Dark Interiors

Mention has previously been made of the high reflectivity of aluminum paint. This may run as high as 70 per cent; that is, 70 per cent of all the light falling upon the surface is reflected and 30 per cent is absorbed. The reflectivity of aluminum paint is much higher for infra-red or the long heat waves than for visible light. Some of the white pigments, such as white lead and zinc oxide have a somewhat higher reflectivity than aluminum bronze powder paints, but their protective properties are inferior to aluminum paint. Aluminum paint, therefore, is the paint par excellence where high reflectivity and long life are desired. Paints made with polished powder and almost any vehicle in which the powder will leaf satisfactorily, have a reflectivity between 60 and 70 per cent.

Aluminum paint is, of course, immune to the "darkening" experienced by lead pigment paints in atmospheres high in sulphur-containing gases. Experience has also shown aluminum paint to stain less from soot and dust and water settling on it; the dust seems to wash and brush off quite readily leaving the paint film quite uniform in color, instead of with objectionable contrasty stains as is the case with so many light colored paints.

Users are always surprised and pleased at the improved illumination obtained by substituting aluminum paint for the black or dark colored paints so often used in storerooms, warehouses, vaults, passageways, etc.

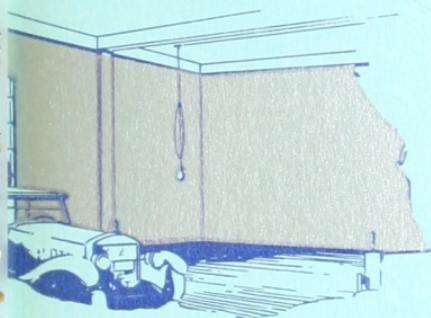


Cuts evaporation-loss from oil tanks by reflecting sun's heat—Results of Bureau of Mines' Test

Cooling Tanks

One of the special applications where aluminum paint has already found extensive use is in painting the exterior of oil storage tanks. In the "sunny South" solar radiation is of such intensity on a bright

day that every square foot of surface normal to the sun's rays may receive as much as 4 or 5 Btu. per minute. When even a relatively small-sized tank is under consideration, it can readily be seen that there is a tremendous amount of energy falling on it which must be either reflected or dissipated in some way after absorption. A highly reflecting aluminum paint is con-

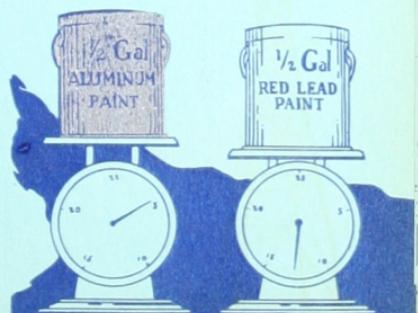


sequently extremely useful in such a situation. If the location of the tank is such that there is an excessive settling of dirt on the painted surface, it will probably be found desirable to put only one top coat of aluminum paint on at a time and renew the surface at regular intervals.

The efficiency of aluminum paint in protecting oil storage tanks has been strikingly demonstrated by a test conducted by the Bureau of Mines in cooperation with the State of Oklahoma and described in Bureau of Mines' Report Serial No. 2677, March, 1925. In the test, four 55,000-barrel tanks were painted black, red, gray and aluminum, respectively. They were then filled with fresh Burbank crude oil and kept under observation for a year. A record was kept of the quality and volume of oil as determined monthly; the temperatures of tanks and oil were obtained with recording thermometers. The results were as follows:

Color of Tank	Initial Contents Barrels	Evaporation Loss in One Year Barrels	Loss in Percent	Gravity in One Year °A.P.I.
Black . . .	52,058	649	1.24	.6 °
Red . . .	53,294	609	1.14	.5
Gray . . .	53,192	547	.99	.3
Aluminum . . .	53,418	447	.83	.2

The aluminum painted tank not only saved 200 barrels more of oil



"Tinted" Aluminum Paints an interesting field for experiment—new effects for interior decoration

than the black tank, but saved 100 barrels more than its nearest competitor, the gray tank. It should be noted also that the quality of the oil in the aluminum painted tank suffered the least depreciation from the evaporation of the lighter fractions. This splendid showing of the aluminum painted tank was made under adverse conditions, since owing to an accident, it was showered with crude oil and according to the report "was almost black during a part of the test." A 200-barrel saving in light oil would pay for the painting of the tank and yield a dividend in addition.

Special Mixtures

As an interesting and useful illustration of "leafing," a bituminous paint which is jet black can be mixed with aluminum bronze powder to make a paint which can be spread on in one coat and give a surface having a reflectivity of about 70 per cent and which shines like polished aluminum. The aluminum bronze powder leafs so perfectly and so rapidly that the black bituminous base is completely concealed.

Aluminum paint not only conceals the surface over which it is painted, but it conceals small portions of darker colored pigments which may be mixed with it. However, some very pleasing and artistic effects can be secured by mixing colored pigments with aluminum paint in sufficiently large amounts to tint it.

Aluminum paint, because of the opacity of the aluminum flakes, requires relative large additions of other pigments to effect a marked tint. A mixture of 10 per cent white lead by weight with 20 per cent aluminum powder and the balance a long oil varnish gives a paint of battleship gray color. It requires about 10 per cent red oxide with 20 per cent aluminum powder to give a rose tint. Five per cent

brown oxide, 15 per cent chrome yellow or chrome green, each with 20 per cent aluminum powder and the balance vehicle, gave attractive light tinted paints.

These paints are quite unique in appearance, since they combine the metallic luster of the aluminum flakes with



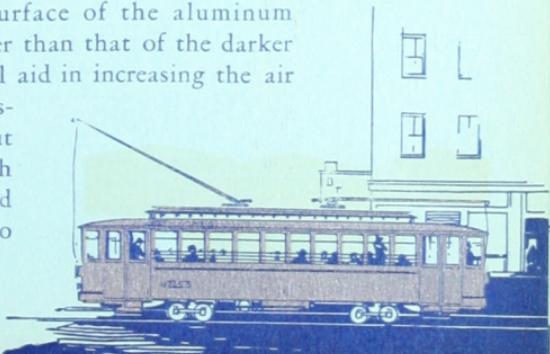
Low emissivity of Aluminum Paint explained—facts about Aluminum Painted "radiators"

the colored pigment. Some remarkable interior decorating effects have been obtained with such paints.

Reducing the Radiation of Heat

As a natural result of the high reflectivity of aluminum paint for heat waves, its emissivity or radiating power for heat waves is low. This property can be made use of for reducing the heat lost from surfaces by radiation. Familiar examples of radiated heat are sunshine and the heat from a glowing body of coals. The hotter a body is, the more heat it radiates. However, at low temperatures—say up to that of boiling water—the heat given off by radiation is usually less than that given off in other ways. At these relatively low temperatures, air currents passing over the heated surface are most effective in dissipating heat. For example, in the case of an ordinary "radiator" one holds his hands above the radiator in order to warm them rather than in front of the radiator, because the maximum heating effect is found in the currents of warm air rising from the radiator and not in the small amount of heat radiated from its surface.

Objections have been raised to the use of aluminum paint on radiators because of the low radiating power (emissivity) of aluminum paint. However, the term radiator is somewhat of a misnomer, for radiators dissipate heat mainly by air convection currents and in smaller part by radiation. Actual measurements show that an aluminum-painted steam radiator dissipates only about 10 to 15 per cent less heat than one painted white, brown or green. This value will vary with the design of the radiator and other surrounding conditions. The surface of the aluminum painted radiator will be hotter than that of the darker colored radiator and this will aid in increasing the air currents over the surface and distributing hot air throughout the room. It is also worth noting that the heat dissipated by radiation goes largely to



Aluminum Paint on furnaces reduces heat-loss— improves working conditions

heat the walls of a room, whereas the heat dissipated by convection warms the air of the room, and hence has a direct effect upon its occupants.

The presence of the aluminum paint does not waste the heat; it simply means that in the particular case cited, with a given steam temperature, a somewhat larger radiator surface will be required to dissipate the same amount of heat, and radiator sizes are usually calculated with sufficient liberality, so that this point is generally of minor importance.

Tinting aluminum paint as described on a previous page will substantially increase its heat dissipating efficiency and at the same time permit the harmonizing of the radiator surface with the decorative color scheme of the room.

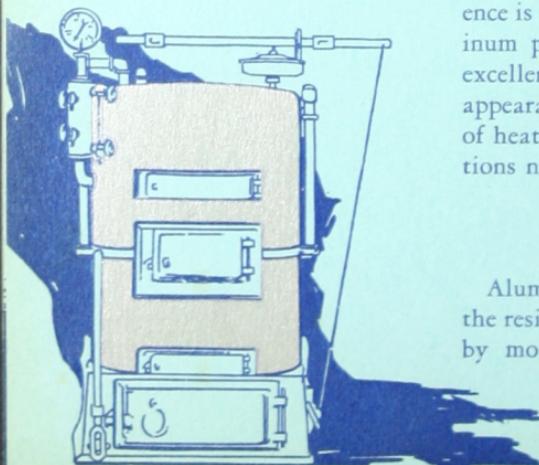
The low emissivity of aluminum paint makes it quite useful on furnaces, ovens, and other heated surfaces where it is desired to radiate as little heat as possible, and where the temperature is high enough to make radiation an important factor.

Oil vehicles especially adapted for use on heated surfaces are now available. Even though the vehicle burns off, the powder remains bright in color and firmly attached to the metal surface at temperatures as high as 700° to 900°F. Vehicles such as spar varnish will also give good service if the temperature is not too high; they should be well thinned out, however. Where the surface is hot enough to burn out the vehicle the coating should not be expected to also withstand exposure to the weather. The surface to which the paint is applied

should be not too smooth if best adherence is to be secured. The use of aluminum paint on heated surfaces offers excellent protection with a pleasing appearance; it will effect some saving of heat and make the working conditions nearby much more comfortable.

Waterproofing

Aluminum bronze powder increases the resistance of a paint to permeation by moisture. The Forest Products



Forest Products Laboratory Test shows Aluminum Paint excellent for waterproofing surfaces

Laboratory has made an extensive study of methods of "moisture proofing" wood with particular reference to airplane propellers. They found that covering the wood with aluminum foil and varnishing it gave the best protection, but they found aluminum paint made with cheap gloss oil and aluminum bronze powder to be very effective. From the previous discussion of the properties of aluminum bronze powder, the reasons for this will be apparent.

They report the following efficiencies of water-resistant wood coatings:

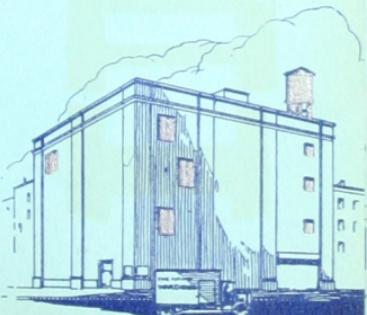
Aluminum leaf process, asphalt paint base.....	98
3 coats asphalt paint.....	96
3 coats aluminum paint (quick drying)	92
3 coats graphite paint.....	61
3 coats spar varnish.....	60
3 coats white lead in oil.....	54

These tests have been extended by the Research Bureau of Aluminum Company of America using the Forest Products Laboratory's method with the following results:—

Coating	2 coats	3 coats
Aluminum Paint made with Spar Varnish No. 1.	94%	96%
Aluminum Paint made with Spar Varnish No. 2.	92	93
Aluminum Paint made with Spar Varnish No. 3.	86	91
Spar Varnish No. 2 alone.....	68	76
Spar Varnish No. 1 alone.....	..	63
Birch Panel uncoated.....	00	00

The specific action of the aluminum flakes is to be observed in that, although the varnish (No. 1) had an efficiency of only 63 per cent, the aluminum paint made from it had an efficiency of 96 per cent. Upon exposure to the weather for a period of six weeks, the waterproofing efficiency of the aluminum paints made with these three varnishes increased to 98, 96 and 96 per cent, respectively.

The extremely high moisture-proofing efficiency of aluminum paint as measured by the Forest Products Laboratory is of great importance in the protection of wood, particularly in view of the following quotation from their Technical Note 181:



Warping and checking in wood caused by moisture— How Aluminum Paint keeps moisture out

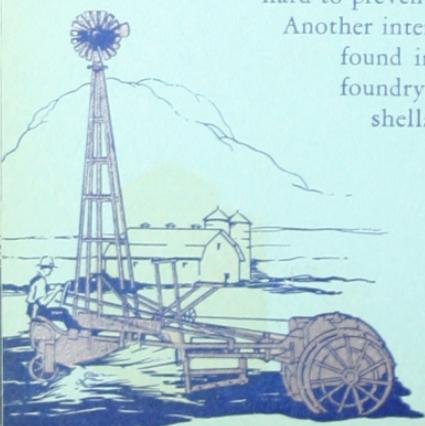
"Shrinking and swelling and internal stresses causing warping and checking are brought about in wood by changes in the moisture content. Such changes are occurring continually when wood is exposed to changing atmospheric conditions, and the only way to prevent or retard them is to protect the wood from the air with some moisture-resistant finish or coating."

The effectiveness of aluminum paint in thus protecting wood has been demonstrated by the tests of Henry A. Gardner, reported in Circular 231 of the Paint Manufacturers' Association of the United States. Certain of these tests were recently examined after four years' exposure, and the effect of aluminum paint both as primer and top coat was quite impressive. A more comprehensive series of tests started by Mr. Gardner in January, 1924, using panels of wood which ordinarily cause difficulty in painting, such as yellow pine, cypress, Douglas fir, etc., elicited the following comment from Mr. Gardner upon examination of the panels after one year's exposure:

"It would appear that in a majority of cases the surfaces primed with metallic primer were in better condition than those without the aluminum primer."

Either bodied linseed oil or long oil spar varnish will prove satisfactory on wood. Care should be taken, however, that the aluminum paint used as primer will dry sufficiently hard to prevent checking of the top coats.

Another interesting use for aluminum paint has been found in painting the wooden patterns used in foundry work. An aluminum paint made with shellac as vehicle provides a rapid drying coating for wooden patterns, which in three coats has a moisture proofing efficiency of approximately 96 per cent. Such a coating is obviously valuable in maintaining constancy of form and dimension of the patterns,

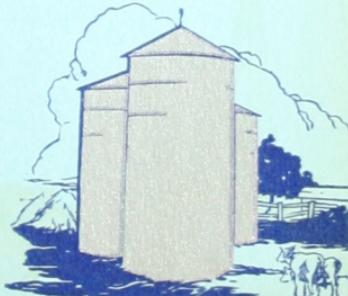


*Aluminum Paint prevents rusting-out of metals—
“Leafing” insures highly durable protection*

and furthermore has the unique property of permitting extremely easy withdrawal from the mold without any adhering of the sand thereto, thus eliminating much of the patching of the molds usually necessary.

Since the corrosion of iron and steel is caused by moisture and oxygen, it is obvious that a highly impermeable paint film is desirable for their protection. The data of the Forest Products Laboratory are highly significant in explaining the excellent protective action of aluminum paint.

Some striking examples of the utilization of the unique properties of aluminum paint are illustrated in the preceding pages. There are many other uses continually being found for it. Where painting problems arise which are not discussed here the technical advice of Aluminum Company of America is at your service and can be consulted through any of the company's offices.



ALUMINUM COMPANY OF AMERICA

Sales Offices at:—

ALBANY, N. Y.	Sumner Building
BOSTON, MASS.	701 National Union Bank Building
BUFFALO, N. Y.	1880 Elmwood Avenue
CHICAGO, ILL.	360 North Michigan Boulevard
CLEVELAND, OHIO	14th Street & Euclid Avenue
DAYTON, OHIO	408 Mutual Home Building
Detroit, Mich.	P. O. Box 746, 3311 Dunn Road
INDIANAPOLIS, IND.	714 Merchants National Bank Bldg.
KANSAS CITY, MO.	1007 Land Bank Building
NEW HAVEN, CONN.	P. O. Box 301, 504 Liberty Building
NEWARK, N. J.	804 Union Building
NEW YORK, N. Y.	120 Broadway
PHILADELPHIA, PA.	15th & Chestnut Streets
PITTSBURGH, PA.	2400 Oliver Building
SAN FRANCISCO, CALIF.	326 Rialto Building
ST. LOUIS, MO.	1825-1833 Boatman's Bank Building
WASHINGTON, D. C.	606-610 Southern Building

Export Sales Office at:—

NEW YORK, N. Y.	120 Broadway
-----------------	--------------

ALUMINUM COMPANY OF CANADA LTD.

Sales Office at:—

TORONTO, ONTARIO	1307-09 Bank of Hamilton Building
------------------	-----------------------------------

ALUMINUM COMPANY OF SOUTH AMERICA

Sales Offices at:—

BUENOS AIRES, ARGENTINA	Reconquista 46
SANTIAGO, CHILE	Casilla 106-D
SAO PAULO, BRAZIL	Caixa Postal "n" (minuscula)

Represented at:—

HABANA, CUBA	by J. L. Bolinaga, America Arias, 74 Bajos (Trocadero)
--------------	--

NORTHERN ALUMINIUM COMPANY LTD.

Sales Offices at:—

BOMBAY, INDIA	P. O. Box 778
LONDON, ENGLAND	Caxton House, Westminister, London, S. W.

L'ALUMINIUM D'AMERIQUE

Sales Office at:—

LONDON, ENGLAND	Bush House, Aldwych, London—WC-2
-----------------	----------------------------------

Represented at:—

BARCELONA, SPAIN	by José Ferrer Turull, Callé Aribau 177
BERLIN, GERMANY	by Ludwig Braasch, Unter den Linden 56
BRUSSELS, BELGIUM	by Henri de Laet, 628 Chaussee de Waterloo
BUDAPEST, HUNGARY	by Armand Perényi, V., Nador-Ucca 30
MILAN, ITALY	by Enea Rossi, Piazza Castello, 6
PRAHA VINOHRADY, CZECHO-SLOVAKIA	by Karel Kindl, u. Havlikovych sadu ln.
TOKIO, JAPAN	by Asia Aluminum Company, Sankyo Bldg.

NORSK ALUMINIUM COMPANY

Sales Office at:—

OSLO (KRISTIANIA) NORWAY	Lokkeveien 9
--------------------------	--------------



